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CHINA RAILWAY DESIGN CORPORATION
КОСТЕ РАЦИНА 166, 11000 БЕОГРАД

2/2.5.3.4.1. TITLE PAGE

	2/2 DESIGN OF ALIGNMENT OF RAILWAY LINE AND STATIONS - SUBSTRUCTURE AND SUPERSTRUCTURE
Investor:	„Serbian Railway Infrastructure" JSC Nemanjina 6/IV, Belgrade
Employer:	Consortium: China Railway International Corporation Ltd. (CRIC) China Communication Construction Company Ltd. (CCCC)
Object:	Belgrade – Subotica – State Border (Kelebija) Railway Line, Section Novi Sad – Subotica – State Border (Kelebija), in Novi Sad, Kisač, Stepanovićevo, Zmajevo, Vrbas, Lovćenac, Mali Iđoš, Bačka Topola, Žednik, Naumovićevo and Subotica, C.M. Novi Sad I, C.M. Novi Sad IV, C.M. Kisač, C.M. Rumenka, C.M. Stepanovićevo, C.M. Čenej, C.M. Bačko Dobro Polje, C.M. Vrbas - ATAR, C.M. Vrbas - grad, C.M. Zmajevo, C.M. Kucura, C.M. Lovćenac, C.M. Mali Iđoš, C.M. Feketić, C.M. Bačka Topola, C.M. Bačka Topola - Grad, C.M. Mali Beograd, C.M. Bikovo, C.M. Donji Grad, C.M. Žednik, C.M. Novi Grad, C.M. Palić, C.M. Stari Grad, on cadastral parcels according to the list attached to Main Notebook
Type of technical documentation:	**DFC –** Design for construction
Name and designation part of project:	**DESIGN OF ALIGNMENT OF RAILWAY LINE AND STATIONS - SUBSTRUCTURE AND SUPERSTRUCTURE 2/2.5.3.4. Design of alignment of railway line and stations - superstructure station Subotica-freight**
For construction / execution of works:	New construction and reconstruction
Designer:	Saobraćajni institut CIP, d.o.o. Nemanjina 6/IV,Beograd 351-02-03602/2020-09
Representative of designer:	Managing Director: Milutin Ignjatović, Grad. Eng.
Signature:	
Responsible designer:	Dragana Jokanović, Grad. Civ. Eng. License number: 315 1404 03
Signature:	Dragana Jokanović Digitally signed by Dragana Jokanović Date: 2022.02.11 13:09:17 +01'00'
Number of designation part of project:	2020-250-CAO-2/2.5.3.4.
Place and date:	Belgrade, December 2021.

2/2-5.3.4.2 TABLE OD CONTENTS

DESIGN OF ALIGNMENT OF RAILWAY LINE AND STATIONS SUBSTRUCTURE AND SUPERSTRUCTURE

STATION SUBOTICA-FREIGHT

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2/2.5.3.4.3. РЕШЕЊЕ О ОДРЕЂИВАЊУ ОДГОВОРНОГ ПРОЈЕКТАНТА

На основу Члана 128, Закона о планирању и изградњи ("Службени гласник РС", бр. 72/09, 81/09-исправка, 64/10- одлука УС, 24/11, 121/12, 42/13-одлука УС, 50/13-одлука УС, 98/13-одлука УС, 132/14, 145/14, 83/2018, 31/2019, 37/2019 - др.закон, 9/20 и 52/21) и одредби Правилника о садржини, начину и поступку израде и начину вршења контроле техничке документације према класи и намени објеката ("Службени гласник РС", бр. 73/2019) као:

О Д Г О В О Р Н И П Р О Ј Е К Т А Н Т

за израду **ПРОЈЕКТА ТРАСЕ ПРУГЕ И СТАНИЦА - ГОРЊИ СТРОЈ, 2/2.5.3.4. Пројекат трасе пруге и станица - горњи строј - станица Суботица - теретна станица**, који је део ПЗИ - Пројекта за извођење за изградњу пруге Београд - Суботица државна граница (Келебија), **ДЕОНИЦА ПРУГЕ НОВИ САД - СУБОТИЦА - ДРЖАВНА ГРАНИЦА (КЕЛЕБИЈА)**, у Новом Саду, Кисачу, Степановићеву, Змајеву, Врбасу, Ловћенцу, Малом Иђошу, Бачкој Тополи, Жеднику, Наумовићеву и Суботици, К.О. Нови Сад I, К.О. Нови Сад IV, К.О. Кисач, К.О. Руменка, К.О. Степановићево, К.О. Ченеј, К.О. Бачко Добро Поље, К.О. Врбас, К.О. Врбас - град, К.О. Змајево, К.О. Куцура, К.О. Ловћенац, К.О. Мали Иђош, К.О. Фекетић, К.О. Бачка Топола, К.О. Бачка Топола - Град, К.О. Мали Београд, К.О. Биково, К.О. Доњи Град, К.О. Жедник, К.О. Нови Град, К.О. Палић, К.О. Стари Град, на катастарским парцелама према списку приложеном у Главној свесци, одређује се:

Драгана Јокановић, дипл. грађ. инж. _____ 315 1404 03

Пројектант:	САОБРАЋАЈНИ ИНСТИТУТ ЦИП д.о.о., Београд Немањина 6/IV
Одговорно лице/заступник:	Генерални директор: Милутин Игњатовић, дипл. инж.
	Потпис:
Број техничке документације:	2020-250-САО-2/2.5.3.4.
Место и датум:	Београд, децембар 2021.год.

2/2.5.3.4.4. ИЗЈАВА ОДГОВОРНОГ ПРОЈЕКТАНТА

Одговорни пројектант **ПРОЈЕКТА ТРАСЕ ПРУГЕ И СТАНИЦА - ГОРЊИ СТРОЈ, 2/2.5.3.4. Пројекат трасе пруге и станица - горњи строј - станица Суботица - теретна станица**, који је део ПЗИ - Пројекта за извођење за изградњу пруге Београд - Суботица државна граница (Келебија), **ДЕОНИЦА ПРУГЕ НОВИ САД - СУБОТИЦА - ДРЖАВНА ГРАНИЦА (КЕЛЕБИЈА)**, у Новом Саду, Кисачу, Степановићеву, Змајеву, Врбасу, Ловћенцу, Малом Иђошу, Бачкој Тополи, Жеднику, Наумовићеву и Суботици, К.О. Нови Сад I, К.О. Нови Сад IV, К.О. Кисач, К.О. Руменка, К.О. Степановићево, К.О. Ченеј, К.О. Бачко Добро Поље, К.О. Врбас, К.О. Врбас - град, К.О. Змајево, К.О. Куцура, К.О. Ловћенац, К.О. Мали Иђош, К.О. Фекетић, К.О. Бачка Топола, К.О. Бачка Топола - Град, К.О. Мали Београд, К.О. Биково, К.О. Доњи Град, К.О. Жедник, К.О. Нови Град, К.О. Палић, К.О. Стари Град, на катастарским парцелама према списку приложеном у Главној свесци:

Драгана Јокановић, дипл. грађ. инж.

И З Ј А В Љ У Ј Е М

1. да је пројекат у свему у складу са издатим Локацијским условима:

-бр. ROP-MSGI-7141-LOC-1/2020, Заводни број: 350-02-00109/2020-14 од 08.05.2020,

-бр. ROP-MSGI-931-LOCA-3/2020, Заводни број: 350-02-00192/2020-14 од 29.05.2020;

-бр. ROP-MSGI-28188-LOCAH-6/2021, Заводни број: 350-02-01883/2021-07 од 30.09.2021. год.

2. да је пројекат у свему у складу са пројектом за грађевинску дозволу и издатом грађевинском дозволом:

-бр. ROP-MSGI-27315-CPI-2/2021, Заводни број: 351-02-03590/2021-07 од 26.10.2021.год.

3. да је пројекат израђен у складу са Законом о планирању и изградњи, прописима, стандардима и нормативима из области изградње објеката и правилима струке;

4. да је пројекат у свему у складу са начинима за обезбеђење испуњења основних захтева за објекат прописаних елаборатима и студијама.

Одговорни пројектант:	Драгана Јокановић, дипл. грађ. инж.
Број лиценце:	315 1404 03
	Потпис:
Број техничке документације:	2020-250-САО-2/2.5.3.4
Место и датум:	Београд, децембар 2021.год.

2/2-5.3.4.5. TEXTUAL DOCUMENTATION

2/2-5.3.4.5.1 TECHNICAL DESCRIPTION

TECHNICAL DESCRIPTION

INTRODUCTION

The Novi Sad - Subotica - State border section is a part of the E85 (Belgrade) - Stara Pazova - Novi Sad - Subotica - State border (Kelebija) main railway line.

The international importance of the E-85 Belgrade – Budapest railway line (Corridor Xb), which is a part of a traditional railway transit corridor connecting Western and Central Europe with Greece, Turkey, and Middle East, has been confirmed by Pan-European priority corridors and Agreements (AGC, AGTC, SEECP), defining the plans and standards of development of the Trans-European railway network, which were ratified as laws by the Republic of Serbia.

The railway line also has a high national importance, emphasized through the Spatial Plan of the Republic of Serbia and Regional Spatial Plan of the Autonomous Province of Vojvodina. It connects three major cities and railway nodes: Belgrade, Novi Sad and Subotica, and numerous settlements and industrial centres along the corridor of the railway line and represents a natural and most rational railway connection between Serbia and Belgrade with Europe via Budapest.

The existing railway line Belgrade – Budapest is single-track, 350km long (184km through Serbia and 166km through Hungary). Train travel time from Belgrade to Budapest, due to poor condition of the railway line, keeps increasing, and now it is 8 hours, and the commercial speed is around 40 km/h.

The aim of modernization of the Belgrade - Budapest railway connection is to establish, by reconstruction of the existing single-track line and construction of the second track, a modern double-track high performance railway line for combined (passenger and freight) traffic and speed up to 200 km/h.

Modernized railway line is to enable commercial speed of 130 km/h of the fastest passenger trains, which will reduce the travel time between Belgrade and Budapest to less than three hours. In addition to speed, the modern double-track line is to enable high level of safety, capacity and comfort in passenger and freight services. This will significantly contribute to competitiveness of the railways in comparison to the other modes of transport, allow for more rational traffic redistribution and increase the environmental protection level.

LAYOUT PLAN

Tracks reconstruction starts at km 174+174.98.
From this km point, in addition to two tracks of the main railway line, the single-track line from Senta will be reconstructed and they will enter Subotica Station on a single track bed.
New underpass is designed at km 174+515.35 to connect the regional road from Senta with the city street network (Grade separation design, Volume 2/3-1.33 and Structural design, Volume 2/1-1.44). Two tracks of the main railway line, one track of the railway line from Senta and two industrial tracks will run across the underpass.
The same tracks run across the underpass in Lošinjska Street at km 174+928.10, which is included in the specific designs (Grade separation design, Volume 2/3-1.34 and Structural design, Volume 2/1-1.45).
Industrial tracks will be connected to Subotica Freight station by switch 1t over newly designed connecting tracks. Construction of safety track was planned.
Double-track main line, single-track line from Senta and industrial tracks are connected to Subotica Freight station by appropriate connecting tracks. A regional single-track line from Horgoš is also connected by double diamond switch 15t (R 215-6°).
The double-track main line and 2 single-track regional lines will continue as separate tracks to Subotica Passenger station.
Thirteen tracks in Subotica Freight station are planned for reconstruction.
Other tracks are not treated in the design, except entry/exit pointwork required for connection of the existing shunting and goods handling tracks in accordance with new track layout.

The following tracks are designed in Subotica Freight station:

Subotica station		Usable lengths (m)
1	Reception and dispatch for international freight trains	797/812
2	Reception and dispatch for international freight trains	798/806
3	Reception and dispatch for international freight trains	785/779
4	Reception and dispatch for international freight trains	705/717
5	Reception and dispatch for international freight trains	614/651
6	Auxiliary	240/292
7	Auxiliary	257/263
8	Auxiliary	302/297
9	Reception and dispatch for domestic freight trains	477/507
10	Reception and dispatch for domestic freight trains	453/464
11	Reception and dispatch for domestic freight trains	484/463
12	Reception and dispatch for domestic freight trains	438/439
13	Reception and dispatch for domestic freight trains	437/439

New service subway with canopy for customs and forwarding purposes is planned in newly designed building at km 175+819.48 and it is included in the specific designs (Architectural design, Volume 1/12.8 and Structural design, Volume 2/9.12.9).
An access road with parking area and turnaround is designed from the existing signal box to this subway.
The existing underpass between Subotica Freight station and Subotica Passenger station in Maksima Gorkog Street at km 176+274.84 will be extended in accordance with newly designed track layout. The Design of this subway is treated in the specific documentation (Grade separation design, Volume 2/3-1.35 and Structural design, Volume 2/1-1.46).

PERMANENT WAY
Appropriate rail type is applied for station tracks in accordance with design speed and purpose of the track.

Left and right tracks of the main railway line

Permanent way on the left and right track of the main railway line is designed with the following characteristics:

- Rail type:
  - 60E1 quality R260 according to SRPS EN 13674-1
- nominal track gauge on straight sections and in curves is 1435 mm, permitted deviations from the designed values of track gauge in accordance with the standard SRPS EN 13231-1
- inclination of axis of symmetry of placed rails towards the track axis in the cross section is 40:1
- length of concrete sleeper is 2.60 m
- ballast width at the end of sleeper is 0.50 m
- inclination of ballast bed slope is 1:1.5
- ballast thickness under sleeper is min 30 cm
- ballast bed made of crushed stone, class 1
- welding of rails to form long welded rail (LWR)
- design treats rail length of 50 m, but it is possible to use longer rails. The rails are delivered without holes in the ends. Rails shall be welded by electric resistance welding or aluminothermic welding (final welding of rails in track into long rail lengths and welding of switches)
- after laying new rails in the track and before acceptance of works, preventive rail grinding is envisaged

- the required resistance to longitudinal rail movement must be at least 7 kN according to SRPS EN 13481-2, when the test has been carried out in accordance with SRPS EN 13146-1
- 60E1-R300-6° switches on the left and right track of the main railway line are installed on concrete sleepers with elastic rail fastening system
- switches are welded into long welded rail (LWR)

Railway lines from Senta and Horgoš, Aleksandrovo industrial track, Subotica - Hospital industrial track and reception/departure tracks from track No. 1 to track No. 13

Permanent way on the railway lines from Senta and Horgoš, Aleksandrovo industrial track, Subotica - Hospital industrial track and reception/departure tracks from track No. 1 to track No. 13 is designed with the following characteristics:

- rail type:
  - 49E1 quality R260 according to SRPS EN 13674-1
- nominal track gauge on straight sections and in curves is 1435 mm, permitted deviations from the designed values of track gauge in accordance with the standard SRPS EN 13231-1
- inclination of axis of symmetry of placed rails towards the track axis in the cross section is 40:1
- length of concrete sleepers is 2.40 m
- ballast width at the end of sleeper is 0.50 m
- inclination of ballast bed slope is 1:1.5
- ballast thickness under sleeper is min 30 cm
- ballast bed made of crushed stone, class 1
- track is welded into long welded rail (LWR)
- design treats rail length of 50 m, but it is possible to use longer rails. The rails are delivered without holes in the ends. Rails shall be welded by electric resistance welding or aluminothermic welding (final welding of rails in track into long rail lengths and welding of switches)
- the following types of switches have been designed (on concrete sleepers and with elastic rail fastening system):
  49E1-R300-6°
  49E1-R200-6°
  49E1-R215-6°
  49E1-12° crossing
- the required resistance to longitudinal rail movement must be at least 7 kN according to SRPS EN 13481-2, when the test has been carried out in accordance with SRPS EN 13146-1.
- switches are welded into long welded rail (LWR)
- elastic buffer stops are designed on safety tracks
- at transition points between tracks of different types, 6 m long transition rails are envisaged

The existing marshaling and goods handling tracks

The existing marshaling and goods handling tracks from track No. 14 to track No. 23 are not treated in the design, except the area of entry and exit pointworks in order to connect the existing marshaling and goods handling tracks according to new track layout.
Based on the existing situation, new permanent way on the existing marshaling and goods handling tracks was designed. Since the existing tracks were not welded in LWR, the tracks in the area of entry and exit pointworks are not planned for welding in LWR.

- rail type:
  - 49E1 quality R260 according to SRPS EN 13674-1

- nominal track gauge on straight sections and in curves is 1435 mm, permitted deviations from the designed values of track gauge in accordance with the standard SRPS EN 13231-1
- inclination of axis of symmetry of placed rails towards the track axis in the cross section is 40:1
- length of concrete sleepers is 2.60 m
- ballast width at the end of sleeper is 0.50 m
- inclination of ballast bed slope is 1:1.5
- ballast thickness under sleeper is min 30 cm
- ballast bed made of crushed stone, class 1
- the rails will be joined by fish plates and coupling bolts with nuts
- the design treats 30 m rail length and shorter depending on the required fitting length. The rails will be delivered with two holes in each end.
- 49E1-R200-6° switches (on wooden sleepers with "K" rail fastening system) are designed:
- the required resistance to longitudinal rail movement must be at least 7 kN according to SRPS EN 13481-2, when the test has been carried out in accordance with SRPS EN 13146-1.
- the switches will not be welded in LWR
- transition rails, 6 m long, are designed at the points of transition between tracks of different types.

For the purpose of horizontal and vertical adjustments, the whole permanent way on track No. 14 shall be made of new material, while the new material for permanent way on other tracks from No. 15 to No. 23 is envisaged only on entry/exit sections that is on the sections necessary for vertical and horizontal adjustments.

Fishplated rail joints will be on solid strutted supports on top of double wooden sleepers along 30 m length or smaller depending on the required fitting length. The fishplated rail joints have to lie opposite to one another. New rails with two holes in each end shall be used for fitting and fishplating of rail joints. When rails are laid at joints between two rails, an expansion gap – opening shall be left. The opening size depends on the rail fitting temperature, rail length, track type and resistances produced in track. The opening size shall be calculated in accordance with the Rulebook on technical specifications and maintenance of track permanent way (Official Gazette of the RS, Nos. 39/2016 and 74/2016).

Rails along transition sections shall be joined to both new and existing tracks.

Ribbed base plates meeting SRPS G1.102 standard shall be used for fastening 49 E1 rails to twin wooden sleepers.

Anti-creep devices are designed at the following LWR end points as protection against longitudinal rail movement:

- at the end of Subotica – Hospital new industrial track: 74 anti-creep devices along 50 m length. The devices shall be arranged in accordance with the Rulebook on technical specifications and maintenance of track permanent way (Official Gazette of the RS, Nos. 39/2016 and 74/2016)

- on turnout track behind switch No. 2t: 74 anti-creep devices along 50 m length. The devices shall be arranged in accordance with the Rulebook on technical specifications and maintenance of track permanent way (Official Gazette of the RS, Nos. 39/2016 and 74/2016)

- from welded diamond switch No. 23t along 50 m length towards non-welded switch No. 11t: 74 anti-creep devices. The devices shall be arranged in accordance with the Rulebook on technical specifications and maintenance of track permanent way (Official Gazette of the RS, Nos. 39/2016 and 74/2016)

- between non-welded switch No. 62t and welded switch No. 64t along 30.91 m length: 206 anti-creep devices, 4 per sleeper. Due to insufficient length, the track shall be secured with additional devices.

INVESTMENT VALUE OF WORKS

The value of works is estimated in the Priced Bill of Quantities. The investment value of works is determined based on quantity measurement notes and unit prices.
The Priced Bill of Quantities includes all works envisaged in this design. Type and description of works are provided according to parameters for construction of new railway lines which are currently applied in constructing this type of facility.
The Priced Bill of Quantities is prepared based on data processed in the office, layout plans, computer processed data and average prices for this type of works according to the provided description of items. The unit prices are expressed in dinars (RSD) based on average prices from the tender and technical documentation for similar facilities and type of works. The Priced Bill of Quantities specifies the value of works on permanent way and the summary of works by types in this design.
Investment estimate of permanent way in Subotica Freight station is **1,510,546,094.00 RSD**

Responsible Designer:

Dragana Jokanović, Grad. Civ. Eng.

2/2-5.3.4.6. NUMERICAL DOCUMENTATION

2/2-5.3.4.6.1. QUANTITIES MEASUREMENT NOTES

2/2.02.00 GROUND WORKS

2/2.02.02 REMOVAL OF EXISTING BALLAST

Open track Novi Sad - Rumenka
14244x2.0+12x50..... **=38 356m³**

2/2.04.00 PERMANENT WAY - PROCUREMENT

2/2.04.01-1 RAIL TYPE 60E1.

Freight Station Subotica
Left track of the main line:
КМ 174+174.98 - КС 4t .....L=892.74m
ПС 4t - ПС 5t.....L=10.00m
КС 5t - ПС 1.....L=952.52m
КС 5t - КС 8t.....L=10.42m
∑=1865.68m

Right track of the main line:
КМ 174+174.98 – КС 8t ..... L=980.89m
ПС 8t - ПС 9t..... L=10.00m
КС 9t - КС 2..... L=906.09m
∑=1896.98m
∑ L.....3762.66 m
3762.66 x 2 x 60.21 kg/m.....=453 099.52 kg.....**=453.1 t**

2/2.04.01-2 RAIL TYPE 49E1.

Freight Station Subotica
Regional railway from Senta*:*
КМ 174+174.98 – КС 13t..... ..L=1069.89m
КС 13t - КС 6..... L=954.96m
∑=2024.85m

Regional railway from Horgosh*:*
КМ 175+268.77 - КС 15t .....L=19.57m
КС 15t - ПС 26t.....L=72.64m
КС 26t - КС 16..... L=934.73m
∑=1026.94m

Industrial track Aleksandrovo
КМ 174+331.13 – КС 1t.....L=632.86m

Industrial track Subotica hospital
КМ 174+287.99 – КС 1 t.....L=675.52.m
ПС 1t – ПС 2t..... L=10.00m
КС 2t – КС 4t..... L=20.21m
КМ 175 + 093.36 – КС 2t..... .....L=50.00m
∑=755.73m

Track № 1:
КС 11t - КС 23t.....5.64+35.84+26.35.....L=67.83m
КС 23t - ПС 27t.....L=20.48m
КС 27t - КС 34t.....L=23.66m
КС 34t - ПС 37t.....L=12.85m
КС 37t - КС 21.....L=864.32m
∑=989.14m

Track № 2:
КС 37t - КС 21.....L=858.00m
∑=858.00m

Track № 3:
КС 36t - ПС 12.....L=812.25m
∑=812.25m

Track № 4:

КС 38t - КС 15.....L=763.14m
∑=763.14m

Track № 5:
КС 26t - КС 34t.....L=23.02m
КС 34t - ПС 36t.....L=11.92m
КС 36t - ПС 38t.....L=12.21m
КС 38t - КС 9.....L=703.14m
∑=750.29m

Track № 6:
КС 40t - КС 50t.....L=351.71m
∑=351.71m

Track № 7:
КС 39t - ПС 40t.....L=18.09m
КС 40t - КС 49t.....L=323.11m
∑=341.20m

Track № 8:
КС 27t - ПС 39t..... L=130.81m
КС 39t - КС 49t.....L=367.76m
ПС 50t - КС 55t.....L=48.57m
∑=547.14m

Track № 9:
КС 32t - КС 55t..... L=575.96m
ПС 55t - КС 60t.....L=18.09m
∑=594.05m

Track № 10:
КС 29t - ПС 32t.....L=18.09m
КС 32t - КС 52t.....L=534.66m
ПС 52t - КС 57t.....L=18.09m
∑=570.84m

Track № 11:
КС 31t - КС 52t.....L=541.14m
∑=541.14m

Track № 12:
КС 35t - КС 53t.....L=494.49m
∑=494.49m

Track № 13:
КС 9t - КС 13t..... ...L=5.06m
КС 13t - КС 15t.....L=11.70m
КС 15t - КС 23t.....L=23.66m
КС 23t - ПС 29t.....L=24.93m
КС 29t - ПС 31t.....L.=10.00m
КС 31t - ПС 35t.....L=18.09m
КС 35t - КС 53t.....L=493.75m
ПС 53t - КС 57t..... L=18.09m
ПС 57t - КС 60t.....L=11.76m
ПС 60t - ПС 63t.....L=53.68m
ПС 66t - КС 9.....L=12.85m
∑=683.57m

Track № 14:
ПС 62t - ПС 64t.....L=30.91m
ПС 65t - ПС 8 .....L=10.00m
∑=40.91m
∑ L.....=12 778.25m

12 778.25m x 2 x 49.39 kg/m.....=1 262 235.53kg.....=**1 262.24 t**

RAIL TYPE 49E1- CLASSIC JOINT

Track № 14:
КС 16t – ПС 25t.....5.59+35.51+4.89.....L=46.00m
КС 30t - КС 59t.....L=631.18m
ПС 59t - КС 62t.....L=18.09m
∑=695.27m

Track № 15:
9+10.35+22+38.64+80.85……L=160.84m
Track № 16:
2.14+10.43+28.80+58.27+38.64+22.94……L=161.22m
Track № 17:
6.72+24.08+89.37……L=120.17m
Track № 18:
23.92+24.08+107.15……L=155.15m
Track № 19:
25.62+24.08+61.90……L=111.60m
Track № 20:
105.89+12.04+12.30……L=130.23m
Track № 21:
22.69+10.59+9.58+16.13+23.51+18.09+18.09……L=118.68m
∑ L……=1 653.16m

1 653.16m x 2 x 49.39 kg/m……=163 299.15kg……=**163.30 t**

2/2.04.01-3 TRANSITIONAL RAILS 49E1/60E1.

Freight Station Subotica
KC 2t - KC 4t…… L=6m
KC 9t - KC 13t…… L=6m
∑=12m

12 x 2 x 0.5x (60.21+49.39)kg/m……=1315.2kg……=**1,31t**

2/2.04.01-4 TRANSITIONAL RAILS 45E1/49E1
In places of fit:
Track №15 between the new and the existing track 2 x 6m……=12m
Track №16 between the new and the existing track 2 x 6m……=12m
At the ends of tracks 18,19,20 and 21 on the composition of the new and existing tracks……4x6=24m
∑=48m
48 x 2 x 0.5x (45.11+49.39)kg/m……=4536kg……=**4.54t**

2/2.04.01-5 TRANSITIONAL RAILS 49E1/C
In places of fit:
On the industrial track - Subotica hospital at the place of fitting into the existing track……=6m
6x2x0.5 (45.11+49.39) kg/m……=567kg……=**0.57t**

2/2.04.02-1 CONCRETE SLEEPERS 2.60m long

Freight Station Subotica
(3762.66 + 6)m / 0.6……=**6282 pcs**

2/2.04.02-3 CONCRETE SLEEPERS 2.40m long

Freight Station Subotica
(12 778.25+6)m/ 0.6……=**21 308 pcs**

2/2.04.02-5 WOODEN SLEEPERS 2.60m long

Freight Station Subotica
1653.16/0.6……=2 756 pcs
Wooden sleepers for joints……=76 pcs
∑=2 832 pcs

2/2.04.03-1 ELASTIC TRACK FASTENINGS FOR CONCRETE SLEEPERS AND 60E1 RAIL

Freight Station Subotica
……=**6282 set**

2/2.04.03-2 ELASTIC TRACK FASTENINGS FOR CONCRETE SLEEPERS AND 49E1 RAIL

Freight Station Subotica……=**21 308 set**

2/2.04.03-5 **"K" TYPE TRACK FASTENINGS FOR WOODEN SLEEPERS AND 49E1 RAIL**

Freight Station Subotica

.....**=2 832 set**

Ribbed base plates meeting SRPS G1.102 standard shall be placed on 152 twin wooden sleepers instead of ribbed base plates meeting SRPS G1.101 standard.

2/2.04.03-6 **JOINING PIECES FOR JOINTS 49E1 RAIL**

Freight Station Subotica

Track № 14:

KC 16т – ПС 25t.....(5.59+35.51+4.89)/30+1.....=3

KC 30t – kC 59t.....631.18/30+1.....=21

ПС 59t – КС 62t.....18.09.....=2

Track № 15:

9+10.35+22.....41.35/30+2.....=4

38.64+80.85.....119.49/30+2.....=6

Track № 16:

2.14+10.43+28.80.....41.37/30+2.....=4

58.27+38.64+22.94.....119.85/30+2.....=6

Track № 17:

6.72+24.08+89.37.....120.17/30+1.....=5

Track № 18:

23.92+24.08+107.15.....155.15/30+2.....=8

Track № 19:

25.62+24.08+61.90.....111.6/30+2.....=6

Track № 20:

105.89+12.04+12.30.....130.23/30+2.....=7

Track № 21:

22.69+10.59..... 2+2+1.....=5

9.58+16.13+23.51.....49.22/30+1.....=3

18.09+18.09.....4..... =4

Industrial track – Subotica hospital .....=1

∑=85

Total 85x2.....**170 sets**

2/2.04.04 **FULLY ASSEMBLED SWITCHES ON CONCRETE SLEEPERS**

Freight Station Subotica

Type:

60E1-R300-6°

right: 4t, 5t, 8t, 9t,.....=4pcs

49E1-R300-6°

left: 2t, 38t, ...=2pcs

right: 1t, 26t , 36t, 37t, 63t, 66t.....=6pcs

49E1-R200-6°

left: 35t, 49t, 50t, 52t, 53t, 55t, 57t, 60t.....=8pcs

right: 27t, 29t, 31t, 32t, 39t, 40t, 64t, 65t.....=8pcs

49E1-R215-6°

13t, 15t, 23t, 34t .....= 4 pcs

Crossing 49E1-12°.....= 1 pcs

∑.....**=33 pcs**

2/2.04.04-1 **FULLY ASSEMBLED SWITCHES ON WOODEN SLEEPERS AND "K" TYPE TRACK FASTENINGS**

Freight Station Subotica

Type:

49E1-R200-6°

left: 48t, 56t, 58t, 59t, 61t, 62t.....=6pcs

right: 25t, 30t, 51t, 54t.....=4pcs

∑.....**=10 pcs**

2/2.04.05 **CRUSHED STONE, CATEGORY 1**
Freight Station Subotica
Calculation of quantity according to transverse profiles.....**=51 943.83m³**

2/2.04.06-1 **WELDING SET FOR AT WELDING OF 60E1 RAILS INTO LONG RAILS LENGTH**

Freight Station Subotica
Tracks:
(3762.66 / 300 +1) x 2 .....= 28 pcs
Switches:
4 x 14.....= 56 pcs
∑=84 pcs

2/2.04.06-2 **WELDING SET FOR AT WELDING OF 49E1 RAILS INTO LONG RAILS LENGTH**

Freight Station Subotica:
Tracks:
(12 778.25/ 300 +1) x 2 .....= 88 pcs
Switches:
29 x 14.....= 406 pcs
∑= 494 pcs

2/2.04.07 **DEVICES FOR PREVENTING LENGTHWISE CREEP OF RAILS**

Freight Station Subotica
Rail 49E1(50m).....3 x 74.....= 222pcs
Rail 49E1(30.9m).....30.9 / 0.6 x 4.....= 206pcs
∑=428pcs

2/2.04.08 **DEVICES FOR PREVENTING LATERAL TRACK DISPLACEMENT**

Freight Station Subotica
Devices against lateral movement of concrete sleepers 2.40 m long
(35.84+20.944 +31.416+37.702+37.702+37.702+37.702+ 15,204+ 37.702+76.708+45.292+46.705+46.705 +38.641+36.641+24.765)/0.6+(14.863+115.197+62.837+23.126+169.121)/0.6/3=607.37/0.6+385.14/0.6/3= 1013+214.....**=1227pcs**

2/2.04.09 **FLEXIBLE BUFFER STOP**

Freight Station Subotica
..... **= 1 pcs**

2/2.05.00 PERMANENT WAY - HANDLING

2/2.05.01 **RAIL UNLOADING**
Freight Station Subotica
453.1 t + 1 262.24 t + 163.30 t + 1.31t + 4.54t + 0.57t.....**=1 885.06t**

2/2.05.02 **UNLOADING OF CONCRETE SLEEPERS**
Freight Station Subotica
21 308 + 6 292.....**= 27 590 pcs**

2/2.05.02-1 **UNLOADING OF WOODEN SLEEPERS**
Freight Station Subotica
2832.....**= 2 832 pcs**

2/2.05.03 **UNLOADING OF ELASTIC TRACK FASTENINGS**
Freight Station Subotica
(21 308 + 6 282) x 7.5..... =206 925.00kg.....=206.93t
2832 x 22.37.....=63 351.84kg.....=63.35t
270.28t

2/2.05.04 **UNLOADING OF SWITCHES**

Freight Station Subotica
.....**=43pcs**

2/2.05.05 **UNLOADING DEVICES PREVENTING LONGITUDINAL CREEP OF RAILS**

Freight Station Subotica.....**=428pcs**

2/2.05.06 **UNLOADING OF DEVICES PREVENTING LATERAL DISPLACEMENT OF TRACK**

Open track Novi Sad – Rumenka.....**=1227pcs**

2/2.05.07 **UNLOADING OF ELASTIC BUFFER STOP**

Freight Station Subotica.....**=1pcs**

2/2.06.00 PERMANENT WAY - WORKS

2/2.06.01 **DISMANTLING EXISTING TRACK**

Freight Station Subotica..... L=**16 752.67m**

2/2.06.02 **DISMANTLING EXISTING SWITCHES**

Freight Station Subotica..... =**45pcs**

2/2.06.04-1 **ASSEMBLY AND LAYING TRACK ON CONCRETE SLEEPERS, FIXING IT WITH ELASTIC TRACK FASTENINGS, RAIL TYPE 60E1**

Freight Station Subotica..... L= **3762.66m**

2/2.06.04-2 **ASSEMBLY AND LAYING OF TRACK ON CONCRETE SLEEPERS, FIXING ELASTIC TRACK FASTENING , RAIL TYPE 49E1**

Freight Station Subotica..... L=**12 778.25m**

2/2.06.04-3 **ASSEMBLY AND LAYING OF TRACK ONTO WOODEN SLEEPERS, FIXING WITH "K" TRACK FASTENING, RAIL TYPE 49E1**

Freight Station Subotica..... L=**1 653.16m**

2/2.06.04-4

INSTALLATION OF CROSSING RAILS AT THE PLACEMENTS OF THE NEW AND EXISTING TRACK

Freight Station Subotica.....48+6=54 pcs
9x6m=54m.....=0.06km

2/2.06.05 **ASSEMBLY AND LAYING OF SWITCHES ON CONCRETE SLEEPERS WITH ELASTIC TRACK FASTENINGS**

Freight Station Subotica
Type:
60E1-R300-6°
right: 4t, 5t, 8t, 9t.....=4pcs
49E1-R300-6°
left: 2t, 38t, ...=2pcs
right: 1t,26t, 36t, 37t, 63t, 66t.....=6pcs
49E1-R200-6°
left: 35t, 49t, 50t, 52t, 53t, 55t, 57t, 60t.....=8pcs
right: 27t, 29t, 31t, 32t, 39t, 40t, 64t, 65t.....=8pcs
49E1-R215-6°
13t, 15t, 23t, 34t .....= 4 pcs
Crossing 49E1-12°.....= 1pc

2/2.06.05-1 **ASSEMBLY AND LAYING OF SWITCHES ON WOODEN SLEEPERS WITH ELASTIC TRACK FASTENINGS**

Freight Station Subotica
Type:
49E1-R200-6°
left: 48t, 56t, 58t, 59t, 61t, 62t.....=6pcs
right: 25t, 30t, 51t, 54t.....=4pcs

2/2.06.07-1 **MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON CONCRETE SLEEPERS, RAIL TYPE 60E1**

Freight Station Subotica..... L=**3762.66 m**

2/2.06.07-2 **MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON CONCRETE SLEEPERS, RAIL TYPE 49E1**
Freight Station Subotica..... L=**12 778.25m**

2/2.06.07-3 **MECHANICAL REGULATION AND DYNAMIC STABILIZATION OF SWITCHES**
Freight Station Subotica
Type:
60E1-R300-6°
right: 4t, 5t, 8t, 9t, ...=4pcs
49E1-R300-6°
left: 2t, 38t, ...=2pcs
right: 1t,26t, 36t, 37t, 63t, 66t.....=6pcs
49E1-R200-6°
left: 35t, 49t, 50t, 52t, 53t, 55t, 57t, 60t.....=8pcs
right: 27t, 29t, 31t, 32t, 39t, 40t, 64t, 65t.....=8pcs
49E1-R215-6°
13t, 15t, 23t, 34t .....=4pcs
Crossing 49E1-12°.....=1pc

2/2.06.07-4 **MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON WOODEN SLEEPERS, RAIL TYPE 49E1**
Freight Station Subotica..... L=**1653.16m**

2/2.06.07-5 **MECHANIZED LEVELLING OF EXISTING TRACK ON WOODEN SLEEPERS, RAIL TYPE 49E1**
Freight Station Subotica..... .....L=**63m**

2/2.06.07-6 **MECHANIZED LEVELLING OF SWITCHES ON WOODEN SLEEPERS**
Freight Station Subotica
Type:
49E1-R200-6°
left: 48t, 56t, 58t, 59t, 61t, 62t.....=6pcs
right: 25t, 30t, 51t, 54t.....=4pcs

2/2.06.08-1 **ELECTRIC RESISTANCE WELDING OF 60E1 RAILS TO FORM CONTINUOUS WELDED RAIL**

(3762.66 / 50 +1) x 2 - 28.....=**125pcs**

2/2.06.08-2 **ELECTRIC RESISTANCE WELDING OF 49E1 RAILS TO FORM CONTINUOUS WELDED RAIL**

(12 778.25 / 50 +1) x 2 - 88.....=**426pcs**

2/2.06.08-3 **ALUMINOTHERMIC WELDING OF TRACK INTO LONG RAIL LENGTHS TYPE 60E1**

Freight Station Subotica.....= **28 pcs**

2/2.06.08-4 **ALUMINOTHERMIC WELDING OF TRACK INTO LONG RAIL LENGTHS TYPE 49E1**

Freight Station Subotica.....= **88 pcs**

2/2.06.08-5 **ALUMINOTHERMIC WELDING OF SWITCHES INTO LONG RAIL LENGTHS, RAIL TYPE 60E1**

Freight Station Subotica.....= **56 pcs**

2/2.06.08-6 **ALUMINOTHERMIC WELDING OF SWITCHES INTO LONG RAIL LENGTHS, RAIL TYPE 49E1**
Freight Station Subotica.....= **406 pcs**

2/2.06.09-1 **STRESS RELIEF IN RAILS 60E1 AND FINAL WELDING**

Freight Station Subotica.....L=**3.76km**

2/2.06.09-2 **STRESS RELIEF IN RAILS 49E1 AND FINAL WELDING**

Freight Station Subotica..... L=**12.78km**

2/2.06.09-3 **STRESS RELIEF IN SWITCHES WITH FINAL WELDING**

Freight Station Subotica.....=**33pcs**

2/2.06.10 GRINDING OF RAILS

Freight Station Subotica
Left Track:
km 174+174.98 - km 176+095..... L=1865.68m
Right Track:
km 174+174.98 - km 176+138.41..... L=1896.98m
∑=**3762.66m**

2/2.06.11 ALLOCATION OF DEVICES AGAINST LENGTHWISE CREEP OF RAILS

Freight Station Subotica.....=**428pcs**

2/2.06.12 ALLOCATION OF DEVICES PREVENTING LATERAL DISPLACEMENT OF TRACK

Freight Station Subotica.....=**1227pcs**

2/2.06.13 ERECTION OF ELASTIC BUFFER STOPS

Freight Station Subotica.....=**1pc**

2/2.07.00 PERMANENT WAY - EQUIPMENT

2/2.07.01 PROCUREMENT AND PLACING OF MARKERS

Open track Novi Sad - Rumenka
hectometer markings.....= 36 pcs
kilometer markings.....= 2 pcs
curve markings.....= 181 pcs
long rail track control markings.....2 x 2 x 33 + 12.....= 132 pcs
∑=**351pcs**

2/2.07.02 PROCUREMENT AND POSITIONING OF GRADIENT POSTS

Open track Novi Sad – Rumenka.....=**20pcs**

2/2.07.03 PROCUREMENT AND POSITIONING OF FOULING LOCALISERS

Open track Novi Sad – Rumenka.....=**47pcs**

Одговорни пројектант:

Драгана Јокановић, дипл.грађ.инж.

2/2-5.3.4.6.2.
PRICED BILL OF QUANTITIES

PRICED BILL OF QUANTITIES

2/2.5.3.4 DESIGN OF ALIGNMENT AND STATIONS - PERMANENT WAY

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			A	Б	АхБ
2/2.02.02	**REMOVAL OF EXISTING BALLAST** The Item includes removal of existing ballast with a machine from existing track. This means loading, haulage to 10 km, unloading and levelling or storage of material. The investor may decide upon reuse of removed crushed stone dependent on its quality. Measurement and payment per m^3 of removed ballast.	m^3	38.356,00	886,00	33.983.416,00
2/2.04.00	**PERMANENT WAY - PROCUREMENT**				
2/2.04.01-1	**RAIL TYPE 60E1** The item includes procurement and delivery to site of rail type 60E1, quality R260 according to EN13674 - 1 , in minimum 50m lengths Measurement and payment per ton of delivered rails.	t	453,10	125.000,00	56.637.500,00
2/2.04.01-2	**RAIL TYPE 49E1.** The item includes procurement and delivery to site of rail type 49E1, quality R260 according to EN13674 - 1 , in minimum 50 m lengths. Measurement and payment per ton of delivered rails.	t	1.262,24	105.000,00	132.535.200,00
	30 m lengths Measurement and payment per ton of delivered rails.	t	163,30	105.000,00	17.146.500,00
2/2.04.01-3	**TRANSITIONAL RAILS 49E1/60E1** The item includes procurement and delivery to site of transitional rails 49E1/60E1. Measurement and payment per ton of delivered rails.	t	1,31	112.000,00	146.720,00
2/2.04.01-4	**TRANSITIONAL RAILS 45E1/49E1** The item includes procurement and delivery to site of transitional rails 45E1/49E1. Measurement and payment per ton of delivered rails.	t	4,54	105.000,00	476.700,00
2/2.04.01-5	**TRANSITIONAL RAILS 49E1/S** The item includes procurement and delivery to site of transitional rails 49E1/S Measurement and payment per ton of delivered rails.	t	0,57	105.000,00	59.850,00
2/2.04.02-1	**CONCRETE SLEEPERS, 2.60m LONG** The item includes procurement and delivery to site of concrete sleepers, 2.60m long according to SRPS EN 13230, for rail type 60E1 and rail fastening system according to SRPS EN 13481-2. Measurement and payment per piece.	pcs	6.282,00	5.050,00	31.724.100,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.04.02-3	**CONCRETE SLEEPERS, 2.40m LONG** The item includes procurement and delivery to site of concrete sleepers, 2.40m long according to SRPS EN 13230, for rail type 60E1 and rail fastening system according to SRPS EN 13481-2. Measurement and payment per piece.	pcs	21.308,00	4.500,00	95.886.000,00
2/2.04.02-5	**WOODEN SLEEPERS, 2.60 M LONG** The item includes procurement and delivery to site of full squared wooden sleepers, 2.60m long. Measurement and payment per piece.	pcs	2832	6.000,00	16.992.000,00
2/2.04.03-1	**ELASTIC TRACK FASTENINGS FOR CONCRETE SLEEPERS AND 60E1 RAIL** The Item includes procurement and delivery to site of elastic track fastenings for concrete sleepers and 60E1 rail, according to SRPS EN 13481-2-2013. Measurement and payment per sleeper set of fastenings.	set	6.282,00	2.300,00	14.448.600,00
2/2.04.03-2	**ELASTIC TRACK FASTENINGS FOR CONCRETE SLEEPERS AND 49E1 RAIL** The Item includes procurement and delivery to site of elastic track fastenings for concrete sleepers and 49E1 rail, according to SRPS EN 13481-2-2013. Measurement and payment per sleeper set of fastenings.	set	21.308,00	1.450,00	30.896.600,00
2/2.04.03-5	**"K" TYPE TRACK FASTENINGS FOR WOODEN SLEEPERS AND 49E1 RAIL** The item includes procurement and delivery to site of K type track fastenings for wooden sleepers and 49E1 rail. Measurement and payment per set for one rail.	set	2.832,00	3.600,00	10.195.200,00
2/2.04.03-6	**JOINING PIECES FOR JOINTS 49E1 RAIL** The item includes procurement and delivery to site of joining pieces for joints on 30м for 49E1 rail Measurement and payment per joining pieces for one joint.	pcs	170,00	5.000,00	850.000,00
2/2.04.04	**ASSEMBLED SWITCHES ON CONCRETE SLEEPERS.** The item includes procurement and delivery to site of fully assembled switches with concrete sleepers, track fastening system and full standard equipment in accordance with SRPS EN 13481-7-2013. Measurement and payment per switch.				
	- type 60E1-300-6º	pcs	4,00	11.804.000,00	47.216.000,00
	- type 49E1-300-6º	pcs	8,00	9.440.000,00	75.520.000,00
	- type 49E1-215-6º	pcs	4,00	25.410.000,00	101.640.000,00
	- type 49E1-200-6º	pcs	16,00	8.525.000,00	136.400.000,00
	- crossing 49E1-12º	pcs	1,00	10.200.000,00	10.200.000,00
2/2.04.04-1	**FULLY ASSEMBLED SWITCHES ON WOODEN SLEEPERS AND "K" TYPE TRACK FASTENINGS** The item includes procurement and delivery to site of fully assembled switches with wooden sleepers, track fastening system "K" type and full standard equipment. Measurement and payment per switch.				

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
	- type 49E1-200-6º	pcs	10,00	9.300.000,00	93.000.000,00
2/2.04.05	**CRUSHED STONE, CATEGORY 1** The item includes procurement of crushed stone, its transport in FAD wagons to site and placing. Crushed stone grading shall comply with instruction for acceptance and delivery of crushed stone for track ballast on Serbian railways, and SRPS EN 13450. Measurement and payment per m3 of compacted crushed stone placed in track.	m^3	51.943,83	4.200,00	218.164.086,00
2/2.04.06-1	**WELDING SET FOR AT WELDING OF 60E1 RAILS IN LONG RAIL LENGTHS** The item includes procurement and delivery to site of AT welding sets for rail welding. Measurement and payment per delivered AT set.	pcs	84,00	6.000,00	504.000,00
2/2.04.06-2	**WELDING SET FOR AT WELDING OF 49E1 RAILS INTO LONG RAIL LENGTHS** The item includes procurement and delivery to site of AT welding sets for rail welding. Measurement and payment per delivered AT set.	pcs	494,00	5.000,00	2.470.000,00
2/2.04.07	**DEVICES FOR PREVENTING LENGTHWISE CREEP OF RAILS** The item includes procurement and delivery to site of devices for preventing lengthwise creep of rails. Measurement and payment per each device. for rail 49E1	pcs	428,00	1.400,00	599.200,00
2/2.04.08	**DEVICES FOR PREVENTING LATERAL TRACK DISPLACEMENT** The item includes procurement and delivery to site of devices for preventing lateral track displacement. Measurement and payment per delivered devices for: concrete sleepers	pcs	1.227,00	2.700,00	3.312.900,00
2/2.04.09	**FLEXIBLE BUFFER STOP** The item includes procurement, transport and fixing of flexible buffer stop. Measurement and payment per each delivered flexible buffer stop.	pcs	1,00	254.000,00	254.000,00
	SUBTOTAL PERMANENT WAY - PROCUREMENT:				**1.097.275.156,00**
2/2.05.00	**PERMANENT WAY - HANDLING**				
2/2.05.01	**RAIL UNLOADING** The item includes unloading of rails from wagon and local transport to point of their laying in track. Measurement and payment per ton of unloaded rails.	t	1.885,06	2.700,00	5.089.662,00
2/2.05.02	**UNLOADING OF CONCRETE SLEEPERS** The item includes unloading sleepers from wagon and transfer to and stacking on site. Measurement and payment per each unloaded sleeper.	pcs	27.590,00	370,00	10.208.300,00
2/2.05.02-1	**UNLOADING OF WOODEN SLEEPERS** The item includes unloading sleepers from wagon and transfer to and stacking on site. Measurement and payment per each unloaded sleeper.	pcs	2.832,00	370,00	1.047.840,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.05.03	**UNLOADING OF ELASTIC TRACK FASTENINGS** The Item includes unloading of elastic track fastenings from wago, transfer to and storage in site store. Measurement and payment per ton of unloaded fastenings	t	270,28	2.900,00	783.812,00
2/2.05.04	**UNLOADING OF SWITCHES** The item includes unloading of switches with concrete sleepers and elastic fastenings from wagon and transfer and stacking on site. Measurement and payment per each unloaded switch.				
	- type 60E1-300-6º	pcs	4,00	72.000,00	288.000,00
	- type 49E1-300-6º	pcs	8,00	66.000,00	528.000,00
	- type 49E1-215-6º	pcs	4,00	60.000,00	240.000,00
	- type 49E1-200-6º	pcs	26,00	60.000,00	1.560.000,00
	- crossing 49E1-12º	pcs	1,00	60.000,00	60.000,00
2/2.05.05	**UNLOADING DEVICES PREVENTING LONGITUDINAL CREEP OF RAILS** The item includes unloading of devices preventing longitudinal creep of rails. Measurement and payment per each unloaded device.	pcs	428,00	24,00	10.272,00
2/2.05.06	**UNLOADING OF DEVICES PREVENTING LATERAL DISPLACEMENT OF TRACK** The item includes unloading of devices preventing lateral displacement of track on concrete and wooden sleepers. Measurement and payment per each unloaded device.	pcs	1.227,00	36,00	44.172,00
2/2.05.07	**UNLOADING OF ELASTIC BUFFER STOP** The item includes unloading of elastic buffer stops from wagon and transfer and stacking in site store. Measurement and payment per each unloaded buffer stop.	pcs	1,00	13.100,00	13.100,00
	SUBTOTAL PERMANENT WAY - HANDLING:				**19.873.158,00**
2/2.06.00	**PERMANENT WAY - WORKS**				
2/2.06.01	**DISMANTLING EXISTING TRACK** The item includes dismantling of existing and deviated tracks from bed, loading, transport to 10 km, unloading and stacking by kind and usability. Measurement and payment per km of dismantled track.	km	16,75	2.880.000,00	48.240.000,00
2/2.06.02	**DISMANTLING EXISTING SWITCHES** The item includes dismantling of existing switches, transport to 10 km, unloading and stacking by kind and usability Measurement and payment per switch.	pcs	45,00	312.000,00	14.040.000,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.06.04-1	**ASSEMBLY AND LAYING TRACK ON CONCRETE SLEEPERS, FIXING IT WITH ELASTIC TRACK FASTENINGS, RAIL TYPE 60 E1.** The Item includes assembly and laying of track onto concrete sleepers, fixing elastic track fastenings, rail type 60E1. Measurement and payment per km of assembled and laid track.	km	3,76	6.105.000,00	22.954.800,00
2/2.06.04-2	**ASSEMBLY AND LAYING OF TRACK ON CONCRETE SLEEPERS, FIXING ELASTIC TRACK FASTENINGS, RAIL TYPE 49 E1** The Item includes assembly and laying of track onto concrete sleepers, fixing with elastic track fastenings, rail type 49E1. Measurement and payment per km of assembled and laid track.	km	12,78	5.360.000,00	68.500.800,00
2/2.06.04-3	**ASSEMBLY AND LAYING OF TRACK ONTO WOODEN SLEEPERS, FIXING WITH K TRACK FASTENING, RAIL TYPE RAIL TYPE 49E1** The Item includes assembly and laying of track onto wooden sleepers, fixing with K track fastenings. Measurement and payment per km of laid track.	km	1,65	5.240.000,00	8.646.000,00
2/2.06.04-4	**INSTALLATION OF CROSSING RAILS AT THE PLACEMENTS OF THE NEW AND EXISTING TRACK** The position includes transport, manipulation and installation of transition rails at the places where the new and existing tracks fit in. Calculation and payment per km of both crossing rails installed	km	0,06	7.200.000,00	432.000,00
2/2.06.05	**ASSEMBLY AND LAYING OF SWITCHES ON CONCRETE SLEEPERS WITH ELASTIC TRACK FASTENINGS** The item includes assembly and laying of switches on concrete sleepers, fixing with elastic track fastenings. Measurement and payment per assembled and laid switch.				
	- type 60E1-300-6º	pcs	4,00	1.800.000,00	7.200.000,00
	- type 49E1-300-6º	pcs	8,00	1.600.000,00	12.800.000,00
	- type 49E1-215-6º	pcs	4,00	1.600.000,00	6.400.000,00
	- type 49E1-200-6º	pcs	16,00	1.600.000,00	25.600.000,00
	- crossing 49E1-12º	pcs	1,00	1.600.000,00	1.600.000,00
2/2.06.05-1	**ASSEMBLY AND LAYING OF SWITCHES ON WOODEN SLEEPERS WITH ELASTIC TRACK FASTENINGS** The item includes assembly and laying of switches on wooden sleepers, fixing with elastic track fastenings. Measurement and payment per assembled and laid switch. - type 49E1-200-6º	pcs	10,00	1.600.000,00	16.000.000,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.06.07-1	**MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON CONCRETE SLEEPERS, RAIL TYPE 60E1** The item includes placing of crushed stone in track, raising of track to required reference level with cant and enlargement in curves, tamping, mechanized aligning of track on the bed and on bridges. on concrete sleepers, with elastic track fastenings, rail type 60E1, formation of ballast prism and maintenance till take-over. Measurement and payment per km of finally levelled track in designed position.	km	3,76	5.200.000,00	19.552.000,00
2/2.06.07-2	**MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON CONCRETE SLEEPERS, RAIL TYPE 49E1** The item includes placing of crushed stone in track, raising of track to required reference level with cant and enlargement in curves, tamping, mechanized aligning of track on the bed and on bridges. on concrete sleepers, with elastic track fastenings, rail type 49E1, formation of ballast prism and maintenance till take-over. Measurement and payment per km of finally levelled track in designed position.	km	12,78	4.300.000,00	54.954.000,00
2/2.06.07-3	**MECHANICAL REGULATION AND DYNAMIC STABILIZATION OF SWITCHES** The item includes placing crushed stone, tamping, aligning and raising and dynamic stabilization of switches on concrete sleepers, and forming of ballast prism and maintenance until commissioning. Measurement and payment per each levelled switch.				
	- type 60E1-300-6º	pcs	4,00	485.000,00	1.940.000,00
	- type 49E1-300-6º	pcs	8,00	470.000,00	3.760.000,00
	- type 49E1-215-6º	pcs	4,00	470.000,00	1.880.000,00
	- type 49E1-200-6º	pcs	16,00	470.000,00	7.520.000,00
	- crossing 49E1-12º	pcs	1,00	470.000,00	470.000,00
2/2.06.07-4	**MECHANIZED LEVELLING AND DYNAMIC STABILIZATION OF TRACK ON WOODEN SLEEPERS, RAIL TYPE 49E1** The item includes placing of crushed stone in track, raising of track to required reference level with cant and enlargement in curves, tamping, mechanized aligning of track on the bed and on bridges. on wooden sleepers, with elastic track fastenings, rail type 49E1, formation of ballast prism and maintenance till take-over. Measurement and payment per km of finally levelled track in designed position.	km	1,66	4.300.000,00	7.138.000,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.06.07-5	**MECHANIZED LEVELLING OF EXISTING TRACK ON WOODEN SLEEPERS, RAIL TYPE 49E1** The item includes raising of track to required reference level with cant and enlargement in curves, tamping, mechanized aligning of track on the bed and on bridges. on wooden sleepers, with elastic track fastenings, rail type 49E1, formation of ballast prism and maintenance till take-over. Measurement and payment per km of finally levelled track in designed position.	km	0,063	2.200.000,00	138.600,00
2/2.06.07-6	**MECHANIZED LEVELLING OF SWITCHES ON WOODEN SLEEPERS** The item includes placing crushed stone, tamping, aligning and raising and dynamic stabilization of switches on wooden sleepers, and forming of ballast prism and maintenance until commissioning. Measurement and payment per each levelled switch. - type 49E1-200-6º	pcs	10,00	470.000,00	4.700.000,00
2/2.06.08-1	**ELECTRIC RESISTANCE WELDING OF 60E1 RAILS TO FORM CONTINUOUS WELDED RAIL** The item includes electric resistance welding of rails into 300 m long sections including treatment and test of welds and provision of weld quality certificates for 60E1 rail. Measurement and payment per weld.	weld	125,00	32.500,00	4.062.500,00
2/2.06.08-2	**ELECTRIC RESISTANCE WELDING OF 49E1 RAILS TO FORM CONTINUOUS WELDED RAIL** The item includes electric resistance welding of rails into 300 m long sections including treatment and test of welds and provision of weld quality certificates for 49E1 rail. Measurement and payment per weld.	weld	426,00	27.000,00	11.502.000,00
2/2.06.08-3	**ALUMINOTHERMIC WELDING OF TRACK INTO LONG RAIL LENGTHS TYPE 60E1** The item includes AT welding of track into long rails, procurement of material for welding, treatment and testing welds and obtaining test certificates on weld quality, for rail type 60E1. Measurement and payment per weld.	weld	28,00	36.000,00	1.008.000,00
2/2.06.08-4	**ALUMINOTHERMIC WELDING OF TRACK INTO LONG RAIL LENGTHS TYPE 49E1** The item includes AT welding of track into long rails, procurement of material for welding, treatment and testing welds and obtaining test certificates on weld quality, for rail type 49E1. Measurement and payment per weld.	weld	88,00	30.000,00	2.640.000,00
2/2.06.08-5	**ALUMINOTHERMIC WELDING OF SWITCHES INTO LONG RAIL LENGTHS, RAIL TYPE 60E1.** The item includes AT welding of switches for rail type 60E1 into CWR, procurement of material for welding, treatment and testing welds and obtaining test certificates on weld quality,. Measurement and payment per weld.	weld	56,00	36.000,00	2.016.000,00

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.06.08-6	**ALUMINOTHERMIC WELDING OF SWITCHES INTO LONG RAIL LENGTHS, RAIL TYPE 49E1.** The item includes AT welding of switches for rail type 49E1 into CWR, procurement of material for welding, treatment and testing welds and obtaining test certificates on weld quality,. Measurement and payment per weld.	weld	406,00	30.000,00	12.180.000,00
2/2.06.09-1	**STRESS RELIEF IN RAILS 60E1 AND FINAL WELDING** The item includes stress relief in rails and final welding. Measurement and payment per km of track.	km	3,76	720.000,00	2.707.200,00
2/2.06.09-2	**STRESS RELIEF IN RAILS 49E1 AND FINAL WELDING** The item includes stress relief in rails and final welding. Measurement and payment per km of track.	km	12,78	576.000,00	7.361.280,00
2/2.06.09-3	**STRESS RELIEF IN SWITCHES WITH FINAL WELDING** The item includes stress relief in switches and final welding. Measurement and payment per switch.				
	- type 60E1-300-6º	ком	4,00	156.000,00	624.000,00
	- type 49E1-300-6º	ком	8,00	132.000,00	1.056.000,00
	- type 49E1-215-6º	ком	4,00	120.000,00	480.000,00
	- type 49E1-200-6º	ком	16,00	120.000,00	1.920.000,00
	- crossing 49E1-12º	ком	1,00	120.000,00	120.000,00
2/2.06.10	**GRINDING OF RAILS.** The item includes preventive rail grinding after laying new rails in track prior to taking over the works. Works on preventive (initial) grinding of rails should be performed in accordance with the European standard EN 13231-3. Measurement and payment per km of track grinding.	km	3,76	1.220.000,00	4.587.200,00
2/2.06.11	**ALLOCATION OF DEVICES AGAINST LENGTHWISE CREEP OF RAILS** The item includes allocation of devices against lengthwise creep of rails. Measurement and payment for devices allocated according to the design.	ком	428,00	650,00	278.200,00
2/2.06.12	**ALLOCATION OF DEVICES PREVENTING LATERAL DISPLACEMENT OF TRACK** The item includes allocation of devices preventing lateral displacement of track. Measurement and payment for devices allocated according to the design.	ком	1.227,00	1.000,00	1.227.000,00
2/2.06.13	**ERECTION OF ELASTIC BUFFER STOPS** The item includes erection of elastic buffer stop. Measurement and payment each.	ком	1,00	144.000,00	144.000,00

	УКУПНО ГОРЊИ СТРОЈ - РАДОВИ НА ГОРЊЕМ СТРОЈУ:	**388.379.580,00**

2/2.07.00	**PERMANENT WAY - EQUIPMENT**

Бр.	Опис радова	Јед. мере	Количина	Јединична цена (дин)	Цена (дин)
			А	Б	АхБ
2/2.07.01	**PROCUREMENT AND PLACING OF MARKERS** The item includes procurement and placing 100 m, km, curve markers and check markers for long rail levels. Measurement and payment per sign and markers.	pcs	351,00	11.400,00	4.001.400,00
2/2.07.02	**PROCUREMENT AND POSITIONING OF GRADIENT POSTS.** The item includes procurement and positioning of gradient posts. Measurement and payment per each gradient post.	pcs	20,00	17.000,00	340.000,00
2/2.07.03	**PROCUREMENT AND POSITIONING OF FOULING LOCALISERS** The item includes procurement and positioning of fouling localisers between tracks. Measurement and payment per localiser.	pcs	47,00	14.400,00	676.800,00

SUBTOTAL PERMANENT WAY - TRACK EQUIPMENT:	5.018.200,00

GRAND SUMMARY

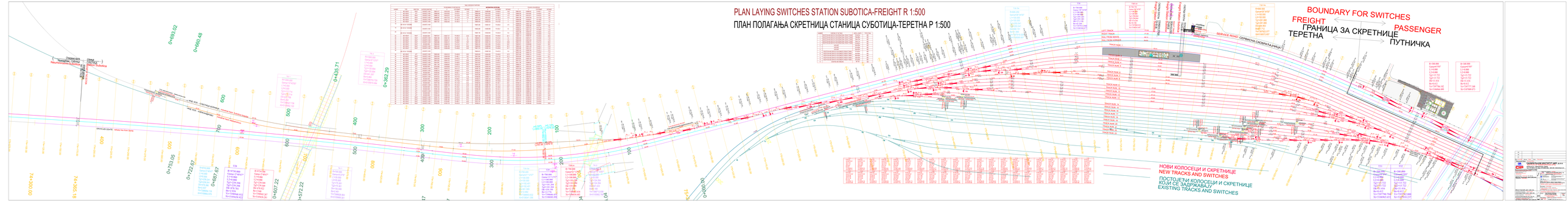
2/2.02.02	**REMOVAL OF EXISTING BALLAST.**	**33.983.416,00**
2/2.04.00	**PERMANENT WAY - PROCUREMENT**	**1.097.275.156,00**
2/2.05.00	**PERMANENT WAY - HANDLING**	**19.873.158,00**
2/2.06.00	**PERMANENT WAY - WORKS**	**388.379.580,00**
2/2.07.00	**PERMANENT WAY - EQUIPMENT**	**5.018.200,00**

GRAND TOTAL (RSD)	:	**1.510.546.094,00**
УКУПНО (EUR):	:	**12.587.885,00**

Одговорни пројектант:

Драгана Јокановић, дипл.грађ.инж.

2/2-5.3.4.7.
GRAPHIC DOCUMENTATION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BOUNDARY FOR SWITCHES
FREIGHT
ГРАНИЦА ЗА СКРЕТНИЦЕ
ТЕРЕТНА
PASSENGER
ПУТНИЧКА
НОВИ КОЛОСЕЦИ И СКРЕТНИЦЕ
NEW TRACKS AND SWITCHES
ПОСТОЈЕЋИ КОЛОСЕЦИ И СКРЕТНИЦЕ
КОЈИМ СЕ ЗАДРЖАВАЈУ
EXISTING TRACKS AND SWITCHES
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0+660.48
0+435.71
0+352.29
0+753.05
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0+687.67
0+607.22
0+572.22
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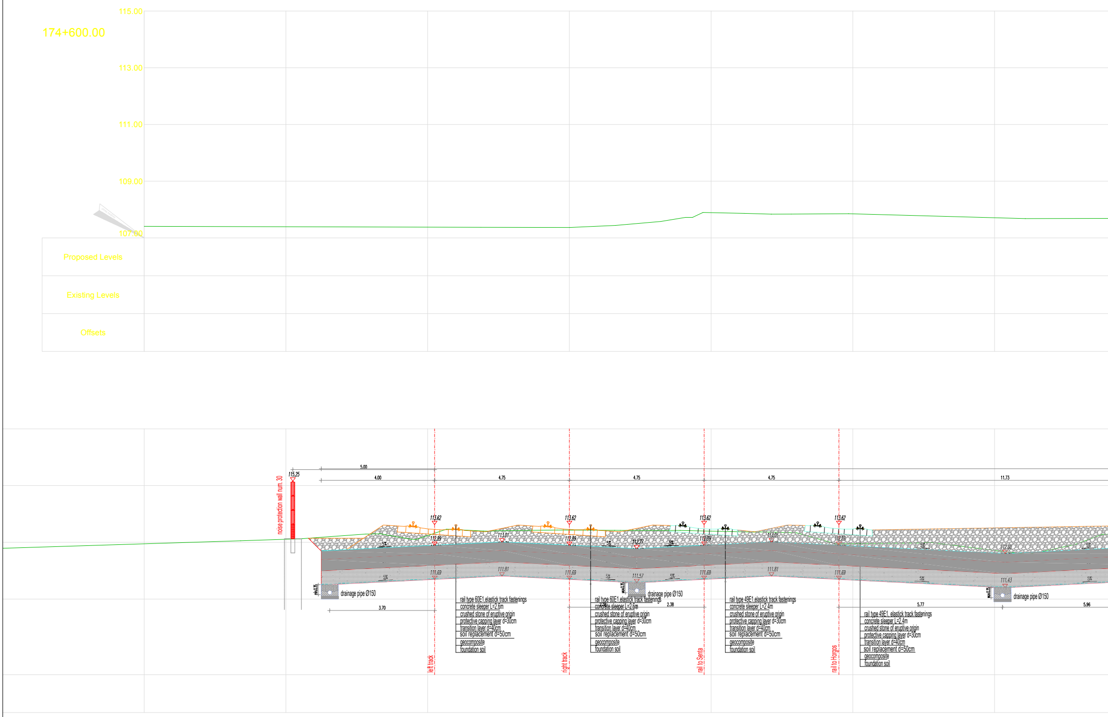
74+355.18

CHARACTERISTIC CROSS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Existing Levels
Offsets
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4.75
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113.62
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5%
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111.43
min0.35
drainage pipe Ø150
drainage pipe Ø150
drainage pipe Ø150
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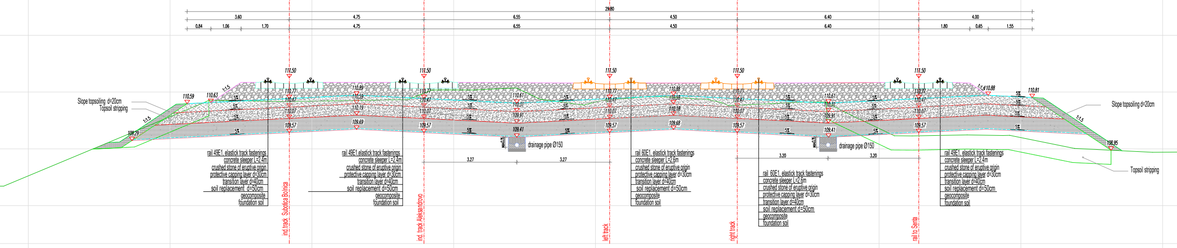
5.77
5.96
rail type 60E1,elastick track fastenings
concrete sleeper L=2.6m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
rail type 60E1,elastick track fastenings
concrete sleeper L=2.6m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
rail type 49E1,elastick track fastenings
concrete sleeper L=2.4m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
rail type 49E1, elastick track fastenings
concrete sleeper L=2.4m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
left track
right track
rail to Senta
rail to Horgos

SECTION STATION SUBOTICA - FREIGHT R 1:50

174+600.00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109.29
5%
Slope topsoiling d=20cm
Topsoil stripping
drainage pipe Ø150
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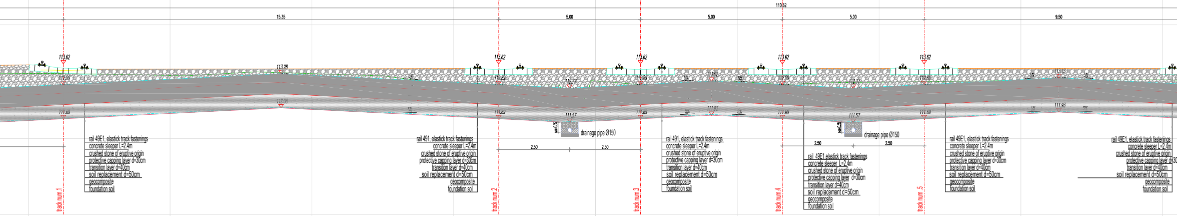
3.20
rail 49E1, elastick track fastenings
rail 49E1,elastick track fastenings
rail 60E1, elastick track fastenings
concrete sleeper L=2.4m
concrete sleeper L=2.6m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
ind.track Subotica Bolnica
ind. track Aleksandrovo
left track
right track
rail to Senta

175+810.24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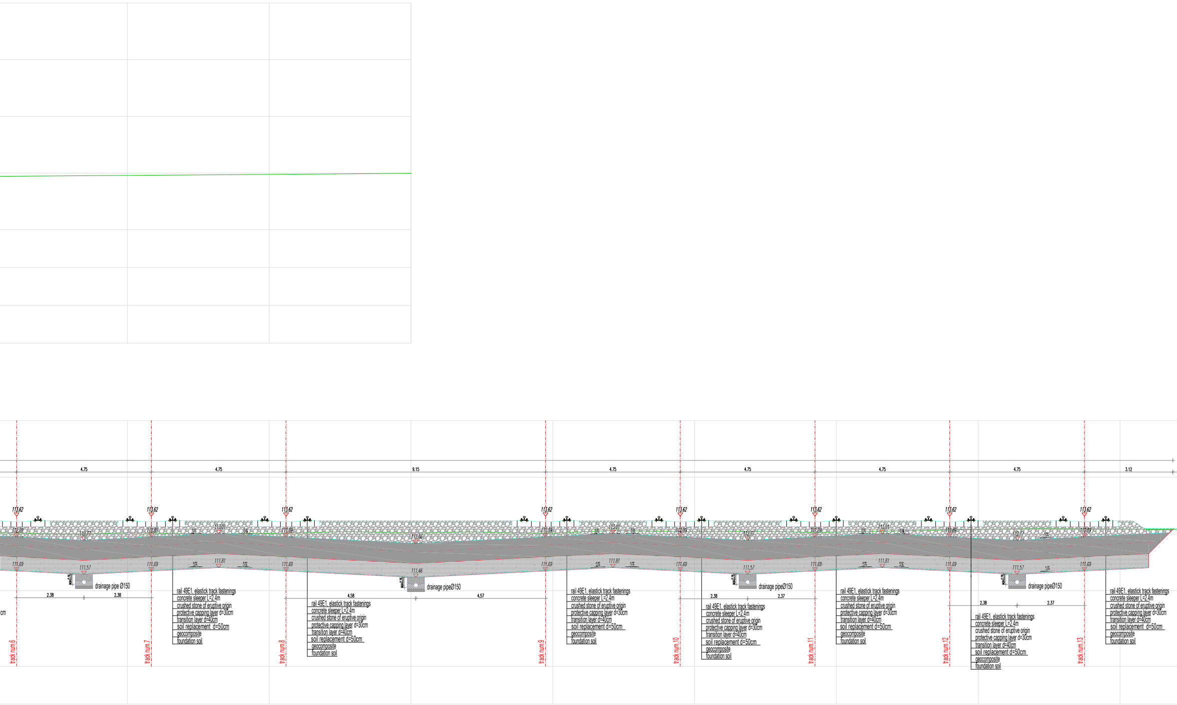
5%
drainage pipe Ø150
2.50
rail 49E1, elastick track fastenings
rail 491, elastick track fastenings
rail 49E1,elastick track fastenings
concrete sleeper L=2.4m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
track num.1
track num.2
track num.3
track num.4
track num.5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111.81
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мин0.35
drainage pipe Ø150
drainage pipeØ150
drainage pipeØ150
drainage pipeØ150
2.38
2.38
4.58
4.57
2.38
2.37
2.38
2.37
cm
rail 49E1, elastick track fastenings
concrete sleeper L=2.4m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
geocomposite
foundation soil
track num.6
track num.7
track num.8
track num.9
track num.10
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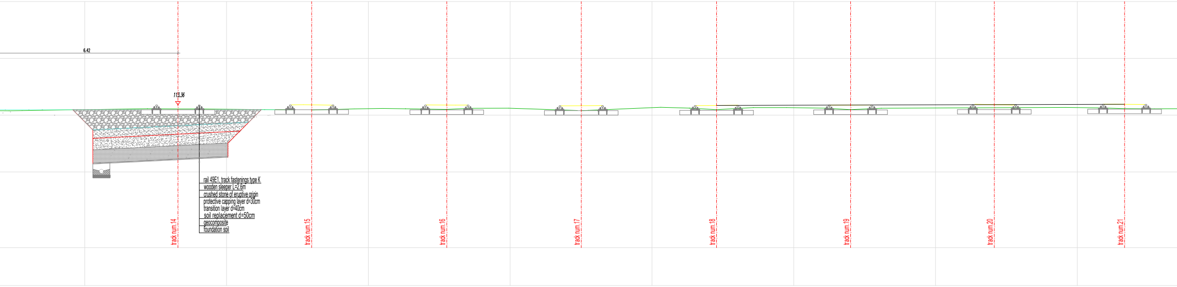
track num.13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wooden sleeper L=2.6m
crushed stone of eruptive origin
protective capping layer d=30cm
transition layer d=40cm
soil replacement d=50cm
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foundation soil
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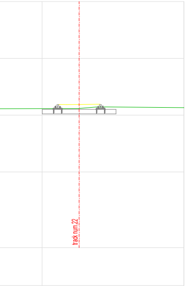
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03		
02		
01		
Број/Number	Датум / Date	Опис / Description

Ревизиони блок: / Revision block:

САОБРАЋАЈНИ ИНСТИТУТ ЦИП, д.о.о.
INSTITUTE OF TRANSPORTATION CIP ltd
Немањина 6; 11000 Београд; Србија
Тел: 011/3618-134; Факс: 011/3618-324; web site: www.sicip.co.rs

Организациона јединица:САОБРАЋАЈНИЦЕ/Organization unit:DEPARTMENT OF ROADS AND RAILWAYS

Одговорни пројектант за трасу пруге:
Железничка станица Суботица
Responsible designer for track alignment:
Railway station Subotica
лиценца број:/ license No.: 315 1404 03
Драгана Јокановић, дипл.грађ.инж.

Сарадници: / Associates:
Милан Старчевић, дипл. грађ. инж.

Унутрашња контрола: / Internal control:
Александра Лалић, дипл.грађ.инж.

Главни пројектант: / Chief designer:
др Љиљана Милић Марковић, дипл. грађ. инж.

Руководилац организационе јединице:
Manager of organization unit:
мр Новица Стевановић, дипл.грађ.инж.

Инвеститор пројекта: / Investor:
" ИНФРАСТРУКТУРА ЖЕЛЕЗНИЦЕ СРБИЈЕ " А.Д.
/ " INFRASTRUCTURE RAILWAYS OF SERBIA " JSC
Немањина 6IV, Београд / Nemanjina Street 6IV, Belgrade

Наручилац пројекта: / Employer: Joint Venture of
中国铁路国际有限公司
CHINA RAILWAY International Co., Ltd.
China Railway International Corporation Ltd. (CRIC)
No.10 Fuxing Road,Haidian District,Beijing
P.R China, 100844

CHINA COMMUNICATIONS CONSTRUCTION COMPANY LIMITED
China Communication Construction Company Ltd. (CCCC)
No.85 Deshengmenwai Street,Xicheng District,Beijing
P.R China, 100088

Објекат: /Structure:
ПРУГА БЕОГРАД - СУБОТИЦА - ДРЖАВНА ГРАНИЦА (КЕЛЕБИЈА)
ДЕОНИЦА ПРУГЕ НОВИ САД - СУБОТИЦА - ДРЖАВНА ГРАНИЦА (КЕЛЕБИЈА)
BELGRADE - SUBOTICA - STATE BORDER (KELEBIA) RAILWAY LINE
SECTION : NOVI SAD - SUBOTICA - STATE BORDER (KELEBIA)

Део пројекта: / Part of Design:
ПРОЈЕКАТ ТРАСЕ ПРУГЕ И СТАНИЦА - ГОРЊИ СТРОЈ
/ DESIGN OF ALIGNMENT OF RAILWAY LINE AND STATIONS -
SUBSTRUCTURE AND SUPERSTRUCTURE
2/2.5.3.4 ПРОЈЕКАТ ТРАСЕ ПРУГЕ И СТАНИЦА - ГОРЊИ СТРОЈ - СТАНИЦА СУБОТИЦА
2/2.5.3.4 DESIGN OF ALIGNMENT OF RAILWAY LINE AND STATIONS -
SUBSTRUCTURE AND SUPERSTRUCTURE - RAILWAY SECTION SUBOTICA

Цртеж: / Drawing:
КАРАКТЕРИСТИЧНИ ПОПРЕЧНИ ПРОФИЛИ
СТАНИЦА СУБОТИЦА - ТЕРЕТНА СТАНИЦА
CHARACTERISTIC CROSS SECTION
STATION SUBOTICA-FREIGHT

Размера: Scale: 1:50

Фаза пројекта: Design phase: **ПЗИ** / DFC
датум:/date: **10.2021.**
Цртеж бр./Drawing No.: 2020-250-CAO-2/2.5.3.4.7.1.2